

	A	B	C	D	E	F	G	H	I	J
1	<div>Appendix A: Emissions Calculations</div> <div>Summary of Emissions</div> <div>Company Name: MGPI of Indiana, LLC</div> <div>Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025</div> <div>Significant Source Modification No.: 0296-35496-00005</div> <div>Significant Permit Modification No.: 029-35505-00005</div> <div>Reviewer: Kristen Willoughby</div> <div>Date: 12/22/14</div>									
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11	Potential to Emit Before Controls (ton/yr)									
12	Significant Emission Units	PM	PM10	PM2.5	SO2	NOx	VOC	CO	GHG	Total HAPs
13		(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)
14	One (1) pneumatic conveyor, identified as EU-11	189.22	189.22	16.08	-	-	-	-	-	-
15	One (1) corn receiving and storage system, identified as EU-12 (Stack S-111)	225.26	225.26	19.15	-	-	-	-	-	-
16	One (1) grain transport system, identified as EU-12 (Stack S-112)	20.33	20.33	1.73	-	-	-	-	-	-
17	Seven (7) storage bins, collectively identified as EU-13	20.33	20.33	1.73	-	-	-	-	-	-
18	Six (6) hammermills, collectively identified as EU-14	90.10	90.10	7.66	-	-	-	-	-	-
19	EU-21, which consists of fourteen (14) open fermenters	-	-	-	-	-	7.81	-	-	0.04
20	DDGS Storage (EU-34)	29.76	29.76	2.53	-	-	-	-	-	-
21	DDGS Rail/Truck Loadout (EU-35/EU-36)	27.18	27.18	2.31	-	-	-	-	-	-
22	DDGS Rail/Truck Loader(EU-37/EU-38)	0.27	0.27	0.05	-	-	-	-	-	-
23	Twenty-four (24) closed fermenters, collectively identified as EU-22	-	-	-	-	-	57.79	-	-	0.26
24	Two (2) beer wells, identified as EU-23 and EU-24	-	-	-	-	-	12.51	-	-	-
25	Distillation (EU-20 and EU-25 through EU-29)	-	-	-	-	-	0.09	-	-	3.43E-03
26	Four (4) paddle screens, identified as EU-31 and three (3) conveyors, identified as EU-33	-	-	-	-	-	440.00	-	-	2.00
27	Five (5) rotary dryers, collectively identified as EU-32	201.04	201.04	201.04	-	-	893.43	-	-	69.90
28	One (1) cooler, and one (1) transport system, collectively identified as EU-32	18.80	13.38	7.94	-	-	9.16	-	-	1.28
29	One (1) DDG Dryer, identified as EU-39	418.77	418.77	418.77	18.84	27.86	418.77	464.28	27,473	39.36
30	Wet Pad, identified as EU-40	-	-	-	-	-	See Note	-	-	See Note
31	One (1) wine room, identified as EU-41	-	-	-	-	-	19.52	-	-	-
32	One (1) tank farm, identified as EU-42	-	-	-	-	-	19.01	-	-	-
33	EU-43, which consists of Building 88	-	-	-	-	-	4.69	-	-	-
34	One (1) mini-tank farm, identified as EU-45	-	-	-	-	-	3.59	-	-	-
35	One (1) barrel and emptying operation, identified as EU-61	-	-	-	-	-	12.01	-	-	-
36	Six (6) warehouses, identified as EU-71 through EU-76	-	-	-	-	-	1867.41	-	-	-
37	One (1) steam boiler, identified as EU-96	1.99	7.96	7.96	0.63	293.37	5.76	88.01	126,479	1.98
38	One (1) steam boiler, identified as EU-97 (worst case fuel)	2.85	3.28	2.21	60.77	28.53	1.12	17.17	31,926	0.39
39	One (1) loading rack, identified as EU-46	-	-	-	-	-	6.69	-	-	0.05
40	Subtotal Significant Emission Unit	1245.92	1246.90	689.16	80.25	349.76	3779	569.46	185878	115.2
41	Fugitive Emissions	-	-	-	-	-	128.2	-	-	0.90
42	Emergency Generator-Diesel	0.28	0.16	0.16	1.62	9.60	0.28	2.20	462	4.41E-03
43	Emergency Generator-Natural gas	1.16E-03	1.46E-03	1.46E-03	1.78E-05	0.10	3.63E-03	0.01	4.29	2.38E-03
44	FW Pump-Diesel	0.13	0.13	0.13	0.12	1.82	0.15	0.39	67.79	1.59E-03
45	Subtotal Insignificant Activities	0.41	0.29	0.29	1.74	11.5	0.43	2.60	533.65	8.38E-03
46	Total	1246.33	1247.19	689.45	81.99	361.28	3908	572.07	186412	116.15
47	Note: This plant is capable to produce both DDGS and MDGS. The emissions from the DDGS production is the worst case scenario. Therefore, the PTE									
48	of the wet cake storage is not included in the PTE for the entire source.									

	A	B	C	D	E	F	G	H	I	J
49	<div>Appendix A: Emissions Calculations</div> <div>Summary of Emissions</div> <div>Company Name: MGPI of Indiana, LLC</div> <div>Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025</div> <div>Significant Source Modification No.: 0296-35496-00005</div> <div>Significant Permit Modification No.: 029-35505-00005</div> <div>Reviewer: Kristen Willoughby</div> <div>Date: 12/22/2014</div>									
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59	Potential to Emit After Control (ton\yr)									
60	Significant Emission Units	PM	PM10	PM2.5	SO2	NOx	VOC	CO	GHG	Total HAPs
61		(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)
62	One (1) pneumatic conveyor, identified as EU-11	1.89	1.89	0.32	-	-	-	-	-	-
63	One (1) corn receiving and storage system, identified as EU-12 (Stack S-111)	2.25	2.25	0.38	-	-	-	-	-	-
64	One (1) grain transport system, identified as EU-12 (Stack S-112)	0.20	0.20	0.03	-	-	-	-	-	-
65	Seven (7) storage bins, collectively identified as EU-13	0.20	0.20	0.03	-	-	-	-	-	-
66	Six (6) hammermills, collectively identified as EU-14	0.90	0.90	0.15	-	-	-	-	-	-
67	EU-21, which consists of fourteen (14) open fermenters	-	-	-	-	-	7.81	-	-	0.04
68	DDGS Storage (EU-34)	0.30	0.30	0.05	-	-	-	-	-	-
69	DDGS Rail/Truck Loadout (EU-35/EU-36)	0.27	0.27	0.05	-	-	-	-	-	-
70	DDGS Rail/Truck Loader(EU-37/EU-38)	0.27	0.27	0.05	-	-	-	-	-	-
71	Twenty-four (24) closed fermenters, collectively identified as EU-22	-	-	-	-	-	57.79	-	-	0.26
72	Two (2) beer wells, identified as EU-23 and EU-24	-	-	-	-	-	12.51	-	-	-
73	Distillation (EU-20 and EU-25 through EU-29)	-	-	-	-	-	0.09	-	-	3.43E-03
74	Four (4) paddle screens, identified as EU-31 and three (3) conveyors, identified as EU-33	-	-	-	-	-	440.00	-	-	2.00
75	Five (5) rotary dryers, collectively identified as EU-32	30.16	30.16	30.16	-	-	893.43	-	-	69.90
76	One (1) cooler, and one (1) transport system, collectively identified as EU-32	4.99	3.22	1.40	-	-	9.16	-	-	1.28
77	One (1) DDG Dryer, identified as EU-39	8.38	8.38	8.38	18.84	27.86	8.38	46.43	27,473	1.18
78	Wet Pad, identified as EU-40	-	-	-	-	-	See Note	-	-	-
79	One (1) wine room, identified as EU-41	-	-	-	-	-	19.52	-	-	-
80	One (1) tank farm, identified as EU-42	-	-	-	-	-	19.01	-	-	-
81	EU-43, which consists of Building 88	-	-	-	-	-	4.69	-	-	-
82	One (1) mini-tank farm, identified as EU-45	-	-	-	-	-	3.59	-	-	-
83	One (1) barrel and emptying operation, identified as EU-61	-	-	-	-	-	12.01	-	-	-
84	Six (6) warehouses, identified as EU-71 through EU-76	-	-	-	-	-	1867	-	-	-
85	One (1) steam boiler, identified as EU-96	1.99	7.96	7.96	0.63	293.37	5.76	88.01	126,479	1.98
86	One (1) steam boiler, identified as EU-97 (worst case fuel)	2.85	3.28	2.21	60.77	28.53	1.12	17.17	31,926	0.39
87	One (1) loading rack, identified as EU-46	-	-	-	-	-	6.69	-	-	0.05
88	Subtotal Significant Emission Unit	54.66	59.29	51.17	80.25	349.76	3,369	151.61	185,878	77.07
89	Fugitive Emissions	-	-	-	-	-	0.0	-	-	0.00
90	Emergency Generator-Diesel	0.28	0.16	0.16	1.62	9.60	0.28	2.20	462	4.41E-03
91	Emergency Generator-Natural gas	1.16E-03	1.46E-03	1.46E-03	1.78E-05	0.10	3.63E-03	0.01	4.29	2.38E-03
92	FW Pump-Diesel	0.13	0.13	0.13	0.12	1.82	0.15	0.39	67.8	1.59E-03
93	Subtotal Insignificant Activities	0.41	0.29	0.29	1.74	11.52	0.43	2.60	534	8.38E-03
94	Total	55.07	59.58	51.46	81.99	361.28	3,369	154.21	186,412	77.08
95	Note: This plant is capable to produce both DDGS and MDGS. The emissions from the DDGS production is the worst case scenario. Therefore, the PTE									
96	of the wet cake storage is not included in the PTE for the entire source.									

	A	B	C	D	E	F	G	H	I	J
97	<div>Appendix A: Emissions Calculations</div> <div>Summary of Emissions</div> <div>Company Name: MGPI of Indiana, LLC</div> <div>Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025</div> <div>Significant Source Modification No.: 0296-35496-00005</div> <div>Significant Permit Modification No.: 029-35505-00005</div> <div>Reviewer: Kristen Willoughby</div> <div>Date: 12/22/2014</div>									
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107	Potential to Emit After Issuance of Permit (Limited PTE) (ton/yr)									
108	Significant Emission Units	PM	PM10	PM2.5	SO2	NOx	VOC	CO	GHG	Total HAPs
109		(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)
110	One (1) pneumatic conveyor, identified as EU-11	189.22	189.22	16.08	-	-	-	-	-	-
111	One (1) corn receiving and storage system, identified as EU-12 (Stack S-111)	5.26	5.26	19.15	-	-	-	-	-	-
112	One (1) grain transport system, identified as EU-12 (Stack S-112)	0.96	0.96	1.73	-	-	-	-	-	-
113	Seven (7) storage bins, collectively identified as EU-13	0.20	0.20	0.03	-	-	-	-	-	-
114	Six (6) hammermills, collectively identified as EU-14	90.1	90.1	7.66	-	-	-	-	-	-
115	EU-21, which consists of fourteen (14) open fermenters	-	-	-	-	-	7.81	-	-	0.04
116	DDGS Storage (EU-34)	0.60	0.60	2.53	-	-	-	-	-	-
117	DDGS Rail/Truck Loadout (EU-35/EU-36)	1.27	1.27	2.31	-	-	-	-	-	-
118	DDGS Rail/Truck Loader(EU-37/EU-38)	5.48	5.48	0.05	-	-	-	-	-	-
119	Twenty-four (24) closed fermenters, collectively identified as EU-22	-	-	-	-	-	57.79	-	-	0.26
120	Two (2) beer wells, identified as EU-23 and EU-24	-	-	-	-	-	12.51	-	-	-
121	Distillation (EU-20 and EU-25 through EU-29)	-	-	-	-	-	0.09	-	-	0.00
122	Four (4) paddle screens, identified as EU-31 and three (3) conveyors, identified as EU-33	-	-	-	-	-	440.00	-	-	2.00
123	Five (5) rotary dryers, collectively identified as EU-32	19.85	19.85	19.85	-	-	893.43	-	-	69.90
124	One (1) cooler, and one (1) transport system, collectively identified as EU-32	7.16	4.43	1.60	-	-	9.16	-	-	1.28
125	One (1) DDG Dryer, identified as EU-39	8.4	8.4	8.4	18.84	27.86	8.37	46.43	27,473	20.30
126	Wet Pad, identified as EU-40	-	-	-	-	-	See Note	-	-	-
127	One (1) wine room, identified as EU-41	-	-	-	-	-	19.52	-	-	-
128	One (1) tank farm, identified as EU-42	-	-	-	-	-	19.01	-	-	-
129	EU-43, which consists of Building 88	-	-	-	-	-	4.69	-	-	-
130	One (1) mini-tank farm, identified as EU-45	-	-	-	-	-	3.59	-	-	-
131	One (1) barrel and emptying operation, identified as EU-61	-	-	-	-	-	12.01	-	-	-
132	Six (6) warehouses, identified as EU-71 through EU-76	-	-	-	-	-	1,867	-	-	-
133	One (1) steam boiler, identified as EU-96	1.99	7.96	7.96	0.63	293.4	5.76	88.0	126,479	1.98
134	One (1) steam boiler, identified as EU-97 (worst case fuel)	1.98	2.65	1.96	39.77	25.38	0.56	10.42	24,674	0.39
135	One (1) loading rack, identified as EU-46	-	-	-	-	-	6.69	-	-	0.05
136	Subtotal Significant Emission Unit	332.43	336.33	89.28	59.25	346.61	3,368	144.86	178,626	96.19
137	Fugitive Emissions	-	-	-	-	-	128.23	-	-	0.90
138	Emergency Generator-Diesel	0.28	0.16	0.16	1.62	9.60	0.28	2.20	462	4.41E-03
139	Emergency Generator-Natural gas	1.16E-03	1.46E-03	1.46E-03	1.78E-05	0.10	3.63E-03	0.01	4.29	2.38E-03
140	FW Pump-Diesel	0.13	0.13	0.13	0.12	1.82	0.15	0.39	67.8	1.59E-03
141	Subtotal Insignificant Activities	0.41	0.29	0.29	1.74	11.5	0.43	2.60	534	8.38E-03
142	Total	332.84	336.63	89.57	60.99	358.13	3,497	147.46	179,159	97.10
143	Note: This plant is capable to produce both DDGS and MDGS. The emissions from the DDGS production is the worst case scenario. Therefore, the PTE									
144	of the wet cake storage is not included in the PTE for the entire source.									

	A	B	C	D	E	F	G
1	<div>Summary of HAP Emissions</div> <div>Company Name:</div> <div>Address:</div> <div>Significant Source Modification No.:</div> <div>Significant Permit Modification No.:</div> <div>Reviewer:</div> <div>Date:</div>						
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11	Significant Emission Units	Benzene	Dichlorobenzene	Formaldehyde	Hexane	Toluene	Lead
12		ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
13							
14	One (1) pneumatic conveyor, identified as EU-11	-	-	-	-	-	-
15	One (1) corn receiving and storage system, identified as EU-12	-	-	-	-	-	-
16	Seven (7) storage bins, collectively identified as EU-13	-	-	-	-	-	-
17	Six (6) hammermills, collectively identified as EU-14	-	-	-	-	-	-
18	EU-21, which consists of fourteen (14) open fermenters	-	-	1.04E-03	-	-	-
19	Silos, surge hopper, and transport system: EU-34 through EU-36	-	-	-	-	-	-
20	Twenty-four (24) closed fermenters, collectively identified as EU-22	-	-	7.69E-03	-	-	-
21	Two (2) beer wells, identified as EU-23 and EU-24	-	-	-	-	-	-
22	Distillation (EU-20 and EU-25 through EU-29)	-	-	2.04E-04	-	-	-
23	Four (4) paddle screens, identified as EU-31 and three (3) conveyors, identified as EU-33	-	-	5.84E-02	-	-	-
24	Five (5) rotary dryers, collectively identified as EU-32	-	-	0.32	-	-	-
25	One (1) cooler, and one (1) transport system, collectively identified as EU-32	-	-	0.43	-	-	-
26	One (1) DDG Dryer, identified as EU-39	4.78E-04	2.73E-04	12.98	0.41	7.74E-04	1.14E-04
27	Wet Pad, identified as EU-40						
28	One (1) rail car loader and one (1) truck loader, identified as EU-37 and EU-38	-	-	-	-	-	-
29	One (1) wine room, identified as EU-41	-	-	-	-	-	-
30	One (1) tank farm, identified as EU-42	-	-	-	-	-	-
31	EU-43, which consists of Building 88	-	-	-	-	-	-
32	One (1) mini-tank farm, identified as EU-45	-	-	-	-	-	-
33	One (1) barrel and emptying operation, identified as EU-61	-	-	-	-	-	-
34	Six (6) warehouses, identified as EU-71 through EU-76	-	-	-	-	-	-
35	One (1) steam boiler, identified as EU-96	2.20E-03	1.26E-03	0.08	1.89	3.56E-03	5.24E-04
36	One (1) steam boiler, identified as EU-97 (worst case fuel)	4.29E-04	2.45E-04	0.02	0.37	6.95E-04	1.80E-03
37	One (1) loading rack, identified as EU-46	-	-	6.69E-03	-	-	-
38	Fugitive Emissions	-	-	0.13	-	-	-
39	Subtotal Significant Emission Unit	3.11E-03	1.78E-03	14.02	2.66	5.03E-03	2.44E-03
40	Emergency Generator-Diesel	2.17E-03	-	2.21E-04	-	7.87E-04	-
41	Emergency Generator-Natural gas	5.87E-05	-	1.67E-03	1.35E-05	-	-
42	FW Pump-Diesel	3.84E-04	-	4.85E-04	-	1.68E-04	-
43	Subtotal Insignificant Activities	2.62E-03	0.00E+00	2.38E-03	1.35E-05	9.55E-04	0.00E+00
44	Total	5.72E-03	1.78E-03	14.03	2.66	5.99E-03	2.44E-03
45	Note: This plant is capable to produce both DDGS and MDGS. The emissions from the DDGS production is the worst case scenario. Therefore, the PTE						
46	of the wet cake storage is not included in the PTE for the entire source.						

	H	I	J	K	L	M	N	O	P	Q	R	S
1	Appendix A: Emissions Calculations MGPI of Indiana, LLC 7 Ridge Avenue, Lawrenceburg, Indiana 47025 0296-35496-00005 029-35505-00005 Kristen Willoughby 12/22/2014											
2												
3												
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7												
8												
9												
10												
11	Cadmium	Chromium	Manganese	Nickel	Acetaldehyde	Propionaldehyde	Methanol	Acrolein	PAH	1,3-Butadiene	Xylene	Total HAP
12	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
13												
14	-	-	-	-	-	-	-	-	-	-	-	0.00
15	-	-	-	-	-	-	-	-	-	-	-	0.00
16	-	-	-	-	-	-	-	-	-	-	-	0.00
17	-	-	-	-	-	-	-	-	-	-	-	0.00
18	-	-	-	-	0.03	2.09E-03	1.04E-03	-	-	-	-	0.04
19	-	-	-	-	-	-	-	-	-	-	-	0.00
20	-	-	-	-	0.23	1.54E-02	7.69E-03	-	-	-	-	0.26
21	-	-	-	-	-	-	-	-	-	-	-	0.00
22	-	-	-	-	2.81E-03	2.04E-04	2.04E-04	-	-	-	-	3.43E-03
23	-	-	-	-	1.77	0.12	0.06	-	-	-	-	2.00
24	-	-	-	-	55.24	-	11.05	3.28	-	-	-	69.90
25	-	-	-	-	0.69	-	0.15	0.01	-	-	-	1.28
26	2.50E-04	3.19E-04	8.65E-05	4.78E-04	20.94	-	4.61	0.42				39.36
27	See Note											-
28	-	-	-	-	-	-	-	-	-	-	-	0.00
29	-	-	-	-	-	-	-	-	-	-	-	0.00
30	-	-	-	-	-	-	-	-	-	-	-	0.00
31	-	-	-	-	-	-	-	-	-	-	-	0.00
32	-	-	-	-	-	-	-	-	-	-	-	0.00
33	-	-	-	-	-	-	-	-	-	-	-	0.00
34	-	-	-	-	-	-	-	-	-	-	-	0.00
35	1.15E-03	1.47E-03	3.98E-04	2.20E-03	-	-	-	-	-	-	-	1.98
36	5.99E-04	5.99E-04	1.20E-03	5.99E-04	-	-	-	-	-	-	-	0.39
37	-	-	-	-	6.69E-03	-	3.34E-02	-	-	-	-	0.05
38	-	-	-	-	1.28E-01	-	6.41E-01	-	-	-	-	0.90
39	2.00E-03	2.38E-03	1.68E-03	3.28E-03	79.0	0.14	16.55	3.71	0.00E+00	0.00E+00	0.00E+00	116.15
40	-	-	-	-	7.06E-05	-	-	2.21E-05	5.94E-04	-	5.40E-04	4.41E-03
41	-	-	-	-	2.35E-04	-	7.50E-05	2.35E-04	4.05E-06	2.48E-05	-	2.32E-03
42	-	-	-	-	3.15E-04	-	-	3.80E-05	6.91E-05	-	1.17E-04	1.58E-03
43	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.21E-04	0.00E+00	7.50E-05	2.95E-04	6.67E-04	2.48E-05	6.58E-04	0.008
44	2.00E-03	2.38E-03	1.68E-03	3.28E-03	79.0	0.14	16.55	3.71	6.67E-04	2.48E-05	6.58E-04	116.155
45												
46												

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9								
10								
11	Stack ID	Process Description	Control Device	Outlet Grain Loading (gr/dscf)	Maximum Air Flow Rate (scfm)	PTE of PM/PM10 after Control* (lb/hr)	PTE of PM/PM10 after Control (ton/yr)	PTE of PM2.5 after Control** (lb/hr)
12	S-103	Grain Receiving and pneumatic conveyor EU-11	Baghouse	0.004	12,600	0.43	1.89	0.07
13	S-111	Corn Receiving and storage system EU-12	Baghouse	0.004	15,000	0.51	2.25	0.09
14	S-112	Grain Transport system EU-12	Baghouse	0.004	1,354	0.05	0.20	0.01
15	inside	Storage: (7) Grain Storage Silos (EU-13)	Baghouse	0.004	1,354	0.05	0.20	0.01
16	S-104	(6) Hammermills and hopper (EU-14)	Baghouse	0.004	6,000	0.21	0.90	0.03
17		DDGS Storage (EU-34)						
18	S-341	Storage silo	Baghouse	0.004	905	0.03	0.14	0.01
19	S-342	Storage silo	Baghouse	0.004	905	0.03	0.14	0.01
20	S-343	Surge Hopper	Baghouse	0.004	86	0.00	0.01	0.00
21	S-344	Surge Hopper	Baghouse	0.004	86	0.00	0.01	0.00
22	S-350	DDGS Rail Loadout (EU-35)	Baghouse	0.004	905	0.03	0.14	0.01
23	S-360	DDGS Truck Loadout (EU-36)	Baghouse	0.004	905	0.03	0.14	0.01
24	S-370	DDGS Rail Car Loader (EU-37)	None	0.004	905	0.03	0.14	0.01
25	S-380	DDGS Truck Loader (EU-38)	None	0.004	905	0.03	0.14	0.01
26	Total					1.4	6.3	0.2
27	*Assume all PM emissions equal PM10 emissions.							
28	** Assume controlled PM2.5 emissions equal 17% PM/PM10 emissions (AP-42 Table 9.9.1-1 Reference 40).							
29								
30	Methodology:							
31	outlet grain loading (gr/dscf) provided by source with maximum air flow rate (scfm)							
32	PTE of PM/PM10 after Control (lb/hr) = Outlet Grain Loading (gr/dscf) x Max. Air Flow Rate (scfm) x (60 min/hr) x (1 lb/7000 gr)							
33	PTE of PM/PM10 after Control (ton/yr) = Outlet Grain Loading (gr/dscf) x Max. Air Flow Rate (scfm) x (60 min/hr) x (1 lb/7000 gr) x (8760 hr/yr) x (1 ton/2000 lb)							
34	PTE before Control (ton/yr) = PTE after Control (ton/yr) / (1-Control Efficiency)							
35	PM2.5 Control Efficiency is assumed to be less than the PM/PM10 Control Efficiency.							

	I	J	K	L	M	N	O	P	Q	R
1	<div>Appendix A: Emissions Calculations</div> <div>Grain Handling</div> <div>Company Name: MGPI of Indiana, LLC</div> <div>Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025</div> <div>Significant Source Modification No.: 0296-35496-00005</div> <div>Significant Permit Modification No.: 029-35505-00005</div> <div>Reviewer: Kristen Willoughby</div> <div>Date: 12/22/2014</div>									
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10										
11	PTE of PM2.5 after Control (ton/yr)	PM/PM10 Control Efficiency	PM2.5 Control Efficiency	PTE of PM/PM10 before Control (ton/yr)	PTE of PM2.5 before Control (ton/yr)	Limited PTE PM (lb/hr)	Limited PTE PM10 (lb/hr)	Limited PTE PM2.5 (lb/hr)	Limited PTE PM (ton/yr)	Limited PTE PM10 (ton/yr)
12	0.32	99%	98%	189.2	16.1					
13	0.38	99%	98%	225.3	19.1	1.20	1.20	1.20	5.26	5.26
14	0.03	99%	98%	20.3	1.73	0.219	0.219	0.219	0.96	0.96
15	0.03	99%	98%	20.3	1.73					
16	0.15	99%	98%	90.1	7.66					
17										
18	0.02	99%	98%	13.6	1.16	0.136	0.136	0.136	0.60	0.60
19	0.02	99%	98%	13.6	1.16					
20	0.00	99%	98%	1.3	0.11					
21	0.00	99%	98%	1.3	0.11					
22	0.02	99%	98%	13.6	1.16	0.289	0.289	0.289	1.27	1.27
23	0.02	99%	98%	13.6	1.16					
24	0.02	0%	0%	0.14	0.02	1.25	1.25	1.25	5.48	5.48
25	0.02	0%	0%	0.14	0.02					
26	1.1	10.9	10.8	602.5	51.2	3.1	3.1	3.1	13.6	13.6
27										
28										
29										
30										
31										
32										
33										
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	A	B	C	D	E
1	<div>Appendix A: Emissions Calculations</div> <div>VOC Emissions from Distillation and Beer Wells</div> <div>Company Name: MGPI of Indiana, LLC</div> <div>Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025</div> <div>Significant Source Modification No.: 0296-35496-00005</div> <div>Significant Permit Modification No.: 029-35505-00005</div> <div>Reviewer: Kristen Willoughby</div> <div>Date: 12/22/2014</div>				
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9					
10	EU-20, 25-29 Distillation	Potential to Emit (PTE) of VOC:			
11					
12					
13			VOC Emission Factor (lb/1000 gal)	VOC Emission rate (lb/hr)	VOC Emission rate (ton/yr)
14			31,221	0.000679	0.1
15					
16	Methodology:				
17					
18	Emission factor is based on facility information and furnished by source.				
19	Emission Rate (lb/hr) = Usage (gal/hr)/1,000 x EF (lb/1,000 gal)				
20	Emission Rate (ton/yr) = Emission Rate (lb/hr) x 8,760 hr/yr / 2,000 lb/ton				
21	EU-20, EU25- EU-29 Distillation Operations				
22					
23	VOC (lb/hr) = 0.02				
24					
25					
26					
27					
28					
29					
30					
31					
32					
33	Methodology:				
34					
35	lb HAPs/lb VOC emission factors are from uncontrolled distillation in Permit No. T133-31145-00003				
36	HAP (ton/yr) = E.F. (lb HAPs/lb VOC) x VOC (lb/hr) x 8760 (hrs/yr) x 1/2000 (ton/lb)				
37					
38	EU-23 and EU-24 Beer Wells #3 and #1				
39					
40	Maximum Usage 1,050 1,000 bu/hr				
41			Emission Factor (lb/1,000 bu)	VOC Emission rate (lb/yr)	VOC Emission rate (ton/yr)
42			VOC 2.72	2.86	12.5
43					
44	Methodology:				
45					
46	Emission factor is based on facility information and furnished by source.				
47	Emission rate (lb/hr) = Maximum usage (1,000 bu/hr) x EF (lb / 1,000 bu)				
48	Emission Rate (lb/hr) = Emission Rate (ton/yr) x 2,000 lb/ton / 8,760 hr/yr				
49					

	A	B	C	D	E
50	EU-21 Open Fermentation	Appendix A: Emissions Calculations			
51		VOC Emissions from Open and Closed Fermentation			
52					
53		Company Name: MGPI of Indiana, LLC			
54		Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025			
55		Significant Source Modification No.: 0296-35496-00005			
56		Significant Permit Modification No.: 029-35505-00005			
57		Reviewer: Kristen Willoughby			
58		Date: 12/22/2014			
59		Potential to Emit (PTE) of VOC from Open Fermentation:			
60					
61					
62		Maximum Usage			
63		1,095,000 bu/yr			
64	EU-22 Closed Fermentation				
65		Pollutant	Emission Factor (lb/1,000 bu)	VOC Emission rate (lb/yr)	VOC Emission rate (ton/yr)
66		Ethanol	14.2	15,549	7.77
67		Ethyl Acetate	0.046	50	0.03
68		Isoamyl Alcohol	0.013	14	0.007
69		Isobutyl Alcohol	0.004	4	0.002
70		Total VOC	14.3		7.81
71		Methodology:			
72		Emission Factors taken from AP-42, Table 9.12.3-1			
73		Emission Rate (ton/yr) = Usage (bu/yr)/1,000 x Emission Factor (lb/1,000 bu) / 2,000 lb/ton			
74		Emission Rate (lb/hr) = Emission Rate (ton/yr) x 2,000 lb/ton / 8,760 hr/yr			
75		Potential to Emit (PTE) of HAP from Open Fermentation:			
76					
77					
78		VOC (lb/hr) = 1.78			
79					
80					
81					
82					
83					
84					
85					
86					
87					
88					
89		Methodology:			
90		lb HAPs/lb VOC emission factors are from uncontrolled distillation in Permit No. T133-31145-00003			
91		HAP (ton/yr) = E.F. (lb HAPs/lb VOC) x VOC (lb/hr) x 8760 (hrs/yr) x 1/2000 (ton/lb)			
92					
93		Potential to Emit (PTE) of VOC Closed Fermentation:			
94					
95		Maximum Usage			
96		8,103,000 bu/yr			
97		Pollutant	Emission Factor (lb/1,000 bu)	VOC Emission rate (lb/yr)	VOC Emission rate (ton/yr)
98		Ethanol	14.2	115,063	57.53
99		Ethyl Acetate	0.046	373	0.19
100		Isoamyl Alcohol	0.013	105	0.05
101		Isobutyl Alcohol	0.004	32	0.02
102		Uncontrolled VOC	14.263		57.8
103		Methodology:			
104		Emission Factors taken from AP-42, Table 9.12.3-1			
105		Emission Rate (ton/yr) = Usage (bu/yr)/1,000 x Emission Factor (lb/1,000 bu) / 2,000 lb/ton			
106		Emission Rate (lb/hr) = Emission Rate (ton/yr) x 2,000 lb/ton / 8,760 hr/yr			
107					

	A	B	C	D	E																					
108	<div>Potential to Emit (PTE) of HAP from Closed Fermentation:</div> <div>VOC (lb/hr) = 13.19</div> <table><tr><td></td><td colspan="2">Closed Fermentation</td></tr><tr><td>Uncontrolled PTE</td><td>lb HAPs/lb VOC</td><td>ton/yr</td></tr><tr><td>Acetaldehyde</td><td>4.02E-03</td><td>2.32E-01</td></tr><tr><td>Propionaldehyde</td><td>2.67E-04</td><td>1.54E-02</td></tr><tr><td>Methanol</td><td>1.33E-04</td><td>7.69E-03</td></tr><tr><td>Formaldehyde</td><td>1.33E-04</td><td>7.69E-03</td></tr><tr><td>Total Uncontrolled HAP</td><td></td><td>0.26</td></tr></table>						Closed Fermentation		Uncontrolled PTE	lb HAPs/lb VOC	ton/yr	Acetaldehyde	4.02E-03	2.32E-01	Propionaldehyde	2.67E-04	1.54E-02	Methanol	1.33E-04	7.69E-03	Formaldehyde	1.33E-04	7.69E-03	Total Uncontrolled HAP		0.26
						Closed Fermentation																				
Uncontrolled PTE						lb HAPs/lb VOC	ton/yr																			
Acetaldehyde						4.02E-03	2.32E-01																			
Propionaldehyde						2.67E-04	1.54E-02																			
Methanol						1.33E-04	7.69E-03																			
Formaldehyde						1.33E-04	7.69E-03																			
Total Uncontrolled HAP							0.26																			
109																										
110																										
111																										
112																										
113																										
114																										
115																										
116																										
117																										
118																										
119																										
120																										
121	Methodology:	<div>lb HAPs/lb VOC emission factors are from uncontrolled distillation in Permit No. T133-31145-00003</div> <div>HAP (ton/yr) = E.F. (lb HAPs/lb VOC) x VOC (lb/hr) x 8760 (hrs/yr) x 1/2000 (ton/lb)</div>																								
122																										
123																										

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64	VOC Emission rate (lb/hr)
65	1.78
66	0.006
67	0.002
68	0.0005
69	1.78
70	
71	
72	
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96	
97	VOC Emission rate (lb/hr)
98	13.14
99	0.04
100	0.01
101	0.004
102	13.2
103	
104	
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1	<div>Appendix A: Em</div> <div>Company Name:</div> <div>Address:</div> <div>Significant Source Modification No.:</div> <div>Significant Permit Modification No.:</div> <div>Reviewer:</div> <div>Date:</div>		
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10			
11	EU-31 and EU-33 Paddle Screens/ Conveyors		
12			Max Usage (gal/hr)
13	Spirits System		20,859
14	Whisky System		4,319
15			
16			
17	Methodology:		
18	Emission Rate = Maximum Usage (gal/hr)/1,000 x VOC Emission factor (lb/1,000 gal)		
19	* Spirits System analysis of stillage based on 0.05% alcohol concentration.		
20	*Whisky System analysis of stillage based on 0.1% alcohol concentration.		
21			
22	VOC (lb/hr) =		
23			
24			
25	Uncontrolled PTE		lb HAPs/lb VOC
26	Acetaldehyde		4.02E-03
27	Propionaldehyde		2.67E-04
28	Methanol		1.33E-04
29	Formaldehyde		1.33E-04
30	Total Uncontrolled HAP		
31	Methodology:		
32	lb HAPs/lb VOC emission factors are from uncontrolled distillation in Permit No. T133-31145-00003 and derived from the mash scrubber emissions		
33	HAP (ton/yr) = E.F. (lb HAPs/lb VOC) x VOC (lb/hr) x 8760 (hrs/yr) x 1/2000 (ton/lb)		

	D	E	F
1	issions Calculations		
2	Summary of Emissions		
3			
4	MGPI of Indiana, LLC		
5	7 Ridge Avenue, Lawrenceburg, Indiana 47025		
6	0296-35496-00005		
7	029-35505-00005		
8	Kristen Willoughby		
9	12/22/2014		
10			
11			
12	VOC Emission Factor* (lb/1,000 gal)	VOC Emission rate (lb/hr)	VOC Emission rate (ton/yr)
13	3.4	70.92	311
14	6.8	29.37	129
15	Total:	100	440
16	100.29		
17			
18			
19			
20			
21			
22			
23			
24	Stillage		
25	ton/yr		
26	1.77		
27	1.17E-01		
28	5.84E-02		
29	5.84E-02		
30	2.00		
31			
32			
33			

	A	B	C
1	EU-32 Rotary Dryers		
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12			
13			Controlled Emission Factor (lb/ton)
14		PM	0.27
15		PM10	0.27
16		PM2.5	0.27
17			
18	Methodology:	Controlled emission Factor from AP-42, Table 9.9.7-1	
19		Controlled Emissions (ton/yr) = Usage (ton/yr) x EF (lb/ton) x 8,760 hr/yr / 2,000 lb/ton	
20		Uncontrolled emissions estimated based on an 85% control efficiency for controlled emissions.	
21		PM2.5 emissions conservatively assumed to be equal to PM10 emissions.	
22			
23			
24		VOC Emissions from the Dryers	
25		Dryer Feed Rate (ton/hr)	Water Content (% by wt)
26		25.5	66.66%
27			
28	Methodology	Potential VOC Emissions from Dryers (lb/hr) = Dryer Feed Rate (25.5 ton/hr) x Water Content of Feed (% by wt) x (lb VOC/lb water) x (2000 lb/1 ton)	
29		Potential VOC Emissions from Dryers (ton/yr) = Potential VOC Emissions from Dryers (lb/hr) x (8760 hr/yr) x (1 ton/2000 lb)	
30			
31			
32		HAP Emissions from the Dryers	
33		HAP	HAP % (by wt of VOC)
34		Acetaldehyde	6.18%
35		Acrolein	0.37%
36		Methanol	1.24%
37		Formaldehyde	0.04%
38		Total	
39	Methodology	Note: HAP emission rates based on performance tests at similar facilities.	
40			
41		Potential HAP Emissions from Dryers (lb/hr) = Potential VOC emissions from dryer (lb/hr) x HAP % by wt of VOC	
42		Potential HAP Emissions from Dryers (ton/yr) = Potential HAP Emissions from Dryers (lb/hr) x (8760 hr/yr) x (1 ton/2000 lb)	

	D	E	F	G	H
1	Appendix A: Emissions Calculations				
2	Five (5) rotary dryers				
3					
4	Company Name: MGPI of Indiana, LLC				
5	Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025				
6	Significant Source Modification No.: 0296-35496-00005				
7	Significant Permit Modification No.: 029-35505-00005				
8	Reviewer: Kristen Willoughby				
9	Date: 12/22/2014				
10					
11	25.5 ton/hr		Limited Usage:	147,000 ton/yr	
12					
13	Controlled Emissions (lb/hr)	Controlled Emissions (ton/yr)	Uncontrolled Emissions (lb/hr)	Uncontrolled Emissions (ton/yr)	Limited Emissions (ton/yr)
14	6.885	30.2	45.90	201.0	19.85
15	6.885	30.2	45.90	201.0	19.85
16	6.885	30.2	45.90	201.0	19.85
17					
18					
19					
20					
21					
22					
23					
24					
25	VOC Content of Water (lb VOC/lb water)	Potential VOC from Dryers (lb/hr)	Potential VOCs from Dryers (ton/yr)		
26	0.006	204.0	893.4		
27					
28					
29					
30					
31					
32					
33	Potential HAP from Dryers (lb/hr)	Potential HAP from Dryers (ton/yr)			
34	12.61	55.24			
35	0.75	3.28			
36	2.52	11.05			
37	0.07	0.32			
38		69.9			
39					
40					
41					
42					

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Appendix A: Emissions Calculations																
2	DDG Cooler and Transport System Emission Estimates																
3																	
4	Company Name: MGPI of Indiana, LLC																
5	Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025																
6	Significant Source Modification No.: 0296-35496-00005																
7	Significant Permit Modification No.: 029-35505-00005																
8	Reviewer: Kristen Willoughby																
9	Date: 12/22/2014																
10																	
	Emission Unit	Emission Point	Description	Uncontrolled PM Emission Factor	Uncontrolled PM ₁₀ Emission Factor	Uncontrolled PM _{2.5} Emission Factor	DDG throughput		Uncontrolled PM Emission Rate		Uncontrolled PM ₁₀ Emission Rate		Uncontrolled PM _{2.5} Emission Rate		Controlled PM Emission Rate		
11																	
12				(lb/ton)	(lb/ton)	(lb/ton)	(ton/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	
13	EU-32	4 Screw Conveyors, 2 Drag Conveyors, 3 Product Conveyors, 1 K-Valve	Grain Conveying	0.061	0.034	0.0058	9.56	83,754	0.58	2.55	0.33	1.42	0.06	0.24	0.09	0.38	
14		Drum Cooler	Grain Conveying	0.061	0.034	0.0058			0.58	2.55	0.33	1.42	0.06	0.24	0.58	2.55	
15								Totals	1.17	5.11	0.65	2.85	0.11	0.49	0.67	2.94	
16																	
	Emission Unit	Emission Point	Description	Controlled PM Emission Factor	Controlled PM ₁₀ Emission Factor	Controlled PM _{2.5} Emission Factor	DDG throughput		Controlled PM Emission Rate		Controlled PM ₁₀ Emission Rate		Controlled PM _{2.5} Emission Rate		Uncontrolled PM Emission Rate		
17																	
18				(lb/ton)	(lb/ton)	(lb/ton)	(ton/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	
19	EU-32	Hammer Mill	Hammer Milling ^(b)	0.067	0.052	0.036	9.56	83,754	0.47	2.05	0.36	1.58	0.26	1.12	3.13	13.69	
20								Totals	0.47	2.05	0.36	1.58	0.26	1.12	3.13	13.69	
21																	
	Emission Unit	Emission Point	Description	Limited PM Emission Rate		Limited PM ₁₀ Emission Rate		Limited PM _{2.5} Emission Rate									
22																	
23				(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)								
24	EU-32	4 Screw Conveyors, 2 Drag Conveyors, 3 Product Conveyors, 1 K-Valve	Grain Conveying	0.58	2.55	0.33	1.42	0.06	0.24								
25		Drum Cooler	Grain Conveying	0.58	2.55	0.33	1.42	0.06	0.24								
26	EU-32	Hammer Mill	Hammer Milling ^(b)	0.47	2.05	0.36	1.58	0.26	1.12								
27	Totals			1.64	7.16	1.01	4.43	0.37	1.60								
28				1.05	4.61	0.69	3.00	0.31	1.36								
29	Methodology:																
30	(a) Factors taken from AP-42, Fifth Edition, Volume 1, Section 9.9.1 (Grain Elevators and Processes).																
31	(b) As recommended by AP-42 Appendix B.2, Table B.2.2 for Category 7 - "Grain Processing" on Page 17, the particle size distribution for PM ₁₀ is 61% of Total PM and for PM _{2.5} is 23% of Total PM for uncontrolled emissions. Additionally,																
32	PM Size Range	Uncontrolled wt%	Collection Efficiency	Controlled Wt													
33	PM _{2.5}	23%	80%	0.046													
34	PM _{2.5} to PM ₁₀	38%	95%	0.019													
35	PM ₁₀ and higher	39%	95%	0.0195													
36		1		0.0845													
37	Overall control:			91.6%													
38	(c) Methodology:																
39	Uncontrolled PTE (lb/hr) = [Uncontrolled Emission Factor (lb/ton DDG) x Production Rate (ton/hr)]																
40	Uncontrolled PTE (ton/yr) = [Uncontrolled Emission Factor (lb/ton DDG) x Production Rate (ton/yr) / 2,000 lb/ton]																
41	Controlled PTE Hammermill (lb/hr) = [Controlled Emission Factor (lb/ton DDG) x Production Rate (ton/hr)]																
42	Controlled PTE Hammermill (ton/yr) = [Controlled Emission Factor (lb/ton DDG) x Production Rate (ton/yr) / 2,000 lb/ton]																
43	Uncontrolled PTE Hammermill (lb/hr) = Controlled PTE Hammermill (lb/hr) / (1 - 85%)																
44	Uncontrolled PTE Hammermill (ton/yr) = Controlled PTE Hammermill (ton/yr) / (1 - 85%)																

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
45	MGPI of Indiana, LLC																
46	Cooler Emissions (Continued)																
47	7 Ridge Avenue, Lawrenceburg, Indiana 47025																
48																	
49	Emission Unit	Emission Point	Description	Uncontrolled Emission Factors ^(a)		0.219 lb/ton DDG		0.016 lbs/ton DDG		0.00033 lbs/ton DDG		0.010 lbs/ton DDG		0.0036 lbs/ton DDG			
50				DDG throughput		VOC		Acetaldehyde		Acrolein		Formaldehyde		Methanol			
51				(ton/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
52																	
53	EU-32	Drum Cooler	Cooling Drum Apparatus	10	83,754	2.09	9.16	0.16	0.69	0.0031	0.014	0.10	0.43	0.034	0.15	0.292	
54		Existing Screw Conveyor	Grain Conveying														
55		New 3 Screw Conveyors, 2 Drag Conveyors, 3 Product Conveyors, 1 K-Valve	Grain Conveying														
56		Existing Hammer Mill and Cyclone	Hammer Milling														
57																	
58	Methodology:																
59	(a) VOC emission factor for DDG cooling taken from a similar operation permitted in Indiana under Permit #T169-31191-00068 (POET Biorefining - North Manchester). HAP emission factors are derived as a percentage of the VOC emission factor presented, assuming																
60	(b) Methodology :																
61	Emission rate (lb/hr) = DDG Throughput (ton/hr) X DDG Cooling Emission factor (lb/ton)																
62	Emission rate (ton/yr) = DDG Throughput (ton/yr) X DDG Cooling Emission factor (lb/ton) x ton/2,000 lb																
63																	
64	Dryer emissions																
65																	
66																	
67																	
68																	
69																	
70																	
71																	
72																	
73	Other DDG Cooler Emission Factors																
74	POET Biorefining - N Manchester																
75	5.685 lb VOC/hr From June 2004 testing at POET-Biorefining Jewell (IA)																
76	26 ton DDG/hr																
76	0.218653846 lb VOC / ton DDG																

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11	Controlled PM ₁₀ Emission Rate		Controlled PM _{2.5} Emission Rate	
12	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
13	0.05	0.21	0.01	0.04
14	0.33	1.42	0.06	0.24
15	0.37	1.64	0.06	0.28
16				
17	Uncontrolled PM ₁₀ Emission Rate		Uncontrolled PM _{2.5} Emission Rate	
18	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
19	2.41	10.53	1.70	7.46
20	2.41	10.53	1.70	7.46
21				
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	R	S	T	U						
45	Significant Source Modification No.: 0296-35496-00005 Significant Permit Modification No.: 029-35505-00005									
46										
47										
48										
49										
50	<table><tr><td colspan="2">Total HAP Emissions</td></tr><tr><td colspan="2">(ton/yr)</td></tr><tr><td colspan="2" rowspan="4">1.28</td></tr><tr></tr><tr></tr><tr></tr></table>				Total HAP Emissions		(ton/yr)		1.28	
Total HAP Emissions										
(ton/yr)										
1.28										
51										
52										
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59	g that individual HAPs are emitted in the									
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1	<div>Appendix B: Emissions Calculations</div> <div>DDG Dryer (EU-39)</div> <div>Company Name: MGPI of Indiana, LLC</div> <div>Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025</div> <div>Significant Source Modification No.: 0296-35496-00005</div> <div>Significant Permit Modification No.: 029-35505-00005</div> <div>Reviewer: Kristen Willoughby</div> <div>Date: 12/22/2014</div>																
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11	Combustion Source		Hourly MMBtu/hr	Annual MMBtu/yr	Heat Content (Btu/scf)	Fuel Usage (MMcf/yr)											
12	Direct-fired Dryer Heat Input Capacity ^(a)		45	394,200	1,020	386.47											
13	RTO Heat Input Capacity ^(a)		8	70,080	1,020	68.71											
14	Total Heat Input Capacity		53	464,280		455.18											
15																	
16	Production Capacity		ton/hr	ton/yr													
17	Short-term Distillers Dry Grain (DDG) Production ^(b)		9.6	83,754													
18																	
19	Control Efficiency For Criteria Emissions (% Removal) ^(c)		Pollutant	Control Efficiency													
20			HAPs	97%													
21			VOC	98%													
22			CO	90%													
23			PM/PM ₁₀ /PM _{2.5}	98%													
24																	
25	Emissions From DDG Drying (EU-39)	Pollutant	NOx		CO		SO ₂		VOC		PM			PM ₁₀		PM _{2.5}	
26		Uncontrolled Emission Factor	0.12		2.0		0.45		10.0		10.0			10.0		10.0	
27			lbs/MMBtu		lbs/MMBtu		lbs/ton DDG		lbs/ton DDG		lbs/ton DDG			lbs/ton DDG		lbs/ton DDG	
28		Units	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr		tpy	lbs/hr	tpy	lbs/hr	tpy
29	Uncontrolled PTE		6.36	27.86	106.00	464.28	4.30	18.84	95.61	418.77	95.61		418.77	95.61	418.77	95.61	418.77
30	Controlled PTE		-	-	10.60	46.43	-	-	1.91	8.38	1.91		8.38	1.91	8.38	1.91	8.38
31	Limited PTE		6.36	27.86	10.60	46.43	4.30	18.84	1.91	8.37	1.91		8.38	1.91	8.38	1.91	8.38
32																	
33	HAP Emissions From DDG Drying (EU-39)	Pollutant Uncontrolled Emission Factor ^(c)	Acetaldehyde		Formaldehyde		Acrolein		Methanol		Total HAP (from Natural Gas Combustion)			Total HAP Emissions ^(e)			
34			0.5		0.31		0.01		0.11		See Below						
35			lbs/ton DDGS		lbs/ton DDGS		lbs/ton DDGS		lbs/ton DDGS								
36		Units	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr		tpy	lbs/hr	tpy		
37	Uncontrolled PTE		4.78	20.94	2.96	12.98	0.10	0.42	1.05	4.61	0.09		0.41	8.99	39.36		
38	Controlled PTE		0.14	0.63	0.09	0.39	0.00	0.01	0.03	0.14	2.82E-03		0.01	0.27	1.18		
39	Limited PTE		1.91	8.38	1.48	6.49	0.10	0.42	1.05	4.61	0.09		0.41	8.99	20.30		

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
40	MGPI of Indiana, LLC												Significant Source Modification No.: 0296-35496-00005 Significant Permit Modification No.: 029-35505-00005				
41	7 Ridge Avenue, Lawrenceburg, Indiana 47025																
42																	
43	Combustion HAPs - Organics																
44			Benzene	Dichlorobenzene	Formaldehyde	Hexane	Toluene	Total - Organics									
45	Emission Factor in lb/MMcf		2.1E-03	1.2E-03	Included	1.8E+00	3.4E-03										
46					Above												
47																	
48	Potential Emission in tons/yr		4.779E-04	2.731E-04		4.097E-01	7.738E-04	4.112E-01									
49																	
50																	
51	Combustion HAPs - Metals																
52			Lead	Cadmium	Chromium	Manganese	Nickel	Total - Metals									
53	Emission Factor in lb/MMcf		5.0E-04	1.1E-03	1.4E-03	3.8E-04	2.1E-03										
54																	
55																	
56	Potential Emission in tons/yr		1.138E-04	2.503E-04	3.186E-04	8.648E-05	4.779E-04	1.247E-03									
57																	
58																	
59	Notes: Design heat inputs of direct fired dryer and of thermal oxidizer provided by the manufacturer (ICM, Inc.).																
	(a) Maximum short-term distiller's dry grain (DDG) production rate taken from facility information. Capacity of proposed system will be equivalent to combined capacity of the existing steam-tube dryers (portion of existing EU-32). Material balance is as follows:																
60																	
61	(b)																
62				(lb/hr)	%solids												
63	Dryer feed		35,508	35.5%													
64	Water / Evaporation		21,508	0%													
65	DDG Production		14,000	90%													
66	Annual operations assume that the proposed dryer will operate at capacity continuously throughout the year.																
67	Dryer uncontrolled emission factors and cyclone/thermal oxidizer control efficiencies provided by the manufacturer (ICM, Inc.). Assume PM/PM ₁₀ emissions are equivalent. Under the Part 70 Permit Program particulate matter with an aerodynamic diameter less than or equal to a																
68	(c) Dryer uncontrolled emission factors and thermal oxidizer control efficiencies provided by the manufacturer (ICM, Inc.). Emission factors for specific HAPs include both process emissions from the DDG drying operations and natural gas combustion emissions occurring																
69	Methodology:																
70	(d) Nox and CO:																
71	Uncontrolled PTE (lb/hr) = [Uncontrolled Emission Factor (lb/MMBtu) x Design Firing Rate (MMBtu/hr)]																
72	Uncontrolled PTE (ton/yr) = [Uncontrolled Emission Factor (lb/MMBtu) x Design Firing Rate (MMBtu/yr) / 2,000 lb/ton]																
73	SO2:																
74	Uncontrolled PTE (lb/hr) = [Uncontrolled Emission Factor (lb/ton DDG) x Production Rate (ton/hr)]																
75	Uncontrolled PTE (ton/yr) = [Uncontrolled Emission Factor (lb/ton DDG) x Production Rate (ton/yr) / 2,000 lb/ton]																
76	VOC, PM/PM10/PM2.5:																
77	Controlled PTE (lb/hr) = [Controlled Emission Factor (lb/ton DDG) x Production Rate (ton/hr)]																
78	Controlled PTE (ton/yr) = [Controlled Emission Factor (lb/ton DDG) x Production Rate (ton/yr) / 2,000 lb/ton]																
79	Uncontrolled PTE (lb/hr) = [Uncontrolled PTE (lb/hr) x (1 - Control Efficiency)]																
80	Uncontrolled PTE (tpy) = [Uncontrolled PTE (tpy) x (1 - Control Efficiency)]																
81	HAPs (lb/ton emission factor):																
82	Uncontrolled PTE (lb/hr) = [Uncontrolled Emission Factor (lb/ton DDG) x Production Rate (ton/hr)]																
83	Uncontrolled PTE (ton/yr) = [Uncontrolled Emission Factor (lb/ton DDG) x Production Rate (ton/yr) / 2,000 lb/ton]																
84	Controlled PTE (lb/hr) = [Uncontrolled Emission Rate (lb/hr) x (1 - Control Efficiency)]																
85	Controlled PTE (ton/yr) = [Uncontrolled Emission Rate (ton/yr) x (1-Control Efficiency)]																
86	HAPs (lb/MMcf emission factor):																
87	Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03																
	Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton																

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q																																																																
88	MGPI of Indiana, LLC												Significant Source Modification No.: 0296-35496-00005 Significant Permit Modification No.: 029-35505-00005																																																																				
89	7 Ridge Avenue, Lawrenceburg, Indiana 47025																																																																																
90																																																																																	
91	Greenhouse Gas Calculations																																																																																
92																																																																																	
93	<table><tr><td></td><td colspan="3">Greenhouse Gas</td></tr><tr><td>94</td><td></td><td>CO2</td><td>CH4</td><td>N2O</td></tr><tr><td>95</td><td>Emission Factor in lb/MMcf</td><td>120,000</td><td>2.3</td><td>2.2</td></tr><tr><td>96</td><td></td><td></td><td></td><td></td></tr><tr><td>97</td><td></td><td></td><td></td><td></td></tr><tr><td>98</td><td>Potential Emission in tons/yr</td><td>27,311</td><td>0.52</td><td>0.50</td></tr><tr><td>99</td><td></td><td></td><td></td><td></td></tr><tr><td>100</td><td></td><td colspan="3"></td></tr><tr><td>101</td><td>Summed Potential Emissions in tons/yr</td><td colspan="3">27,312</td></tr><tr><td>102</td><td></td><td colspan="3"></td></tr><tr><td>103</td><td></td><td colspan="3"></td></tr><tr><td>104</td><td>CO2e Total in tons/yr</td><td colspan="3">27,473</td></tr><tr><td>105</td><td></td><td colspan="3"></td></tr></table>																		Greenhouse Gas			94		CO2	CH4	N2O	95	Emission Factor in lb/MMcf	120,000	2.3	2.2	96					97					98	Potential Emission in tons/yr	27,311	0.52	0.50	99					100					101	Summed Potential Emissions in tons/yr	27,312			102					103					104	CO2e Total in tons/yr	27,473			105				
	Greenhouse Gas																																																																																
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105																																																																																	
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107	Methodology																																																																																
108	The N2O Emission Factor for uncontrolled is 2.2. The N2O Emission Factor for low Nox burner is 0.64.																																																																																
109	Emission Factors are from AP 42, Table 1.4-2 SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03.																																																																																
110	Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.																																																																																
111	Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton																																																																																
112	CO2e (tons/yr) = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission ton/yr x CH4 GWP (25) + N2O Potential																																																																																

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Appendix A: Emissions Calculations																
2	Wet Pad (EU-40)																
3																	
4	Company Name: MGPI of Indiana, LLC																
5	Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025																
6	Significant Source Modification No.: 0296-35496-00005																
7	Significant Permit Modification No.: 029-35505-00005																
8	Reviewer: Kristen Willoughby																
9	Date: 12/22/2014																
10																	
11	Emission Unit	Emission Point ^(a)	Uncontrolled	0.0083				0.0001		0.00002		0.0002		0.00004		Total Emissions	
12			Emission Factors ^(b)	lb/ton wet cake				lb/ton wet cake		lb/ton wet cake		lb/ton wet cake		lb/ton wet cake			
13			Dryer Feed ^(c)	VOC ^(d)				Acetaldehyde ^(d)		Acrolein ^(d)		Formaldehyde ^(d)		Methanol ^(d)			
14			(ton/hr)	(ton/yr)	(lb/hr)	(ton/yr)		(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)		(lb/hr)
15	EU-40	Wet Cake Production, Storage, and Loadout	24.56	215,154	0.20	0.89		0.002	0.0108	0.0005	0.0022	0.005	0.022	0.001	0.0043	0.012	
16																	
17	Notes:																
18	(a) VOC and HAP emissions can result during periods of dryer start-up and shutdown, when the dryer throughput may be diverted to a wet pad so that wet feed is not sent to dry storage.																
19	(b) Emission factor for wet cake taken from a similar operation permitted in Indiana under Permit #T095-30443-00127 (POET Biorefining - Alexandria).																
20	(c) Hourly dryer feed is maximum as taken from the material balance provided by ICM dated 1/30/2015.																
21	(d) Methodology and Sample Calculations:																
22	Emission rate (lb/hr) = Dryer Feed (ton/hr) X Wet Cake Emission factor (lb/ton)																
23	Emission rate (ton/yr) = Dryer Feed (ton/yr) X Wet Cake Emission factor (lb/ton) x ton/2,000 lb																

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11	HAP sions (ton/yr)
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11	EU-41 through EU-43, EU-45, EU-61 Tanks and Bottling Operations		
12		Source	
13		EU-41 (Wine Room)	
14		EU-42 (Tank Farm)	
15		EU-43 (Bldg 88)	
16		EU-45 (Mini Tank Farm)	
17		EU-61 (Whiskey System)	
18		EU-61 (Gin System)	
19		Total	
20			
21	Methodology:		
22		From Permit No. 24407: Emission Factors based on source estimates. No AP-42 or FIRE emission factors are available	
23		Emissions (ton/yr) = Maximum usage (pg/yr)/1,000 x EF (lb/1,000 gal) / 2,000 lb/ton	
24		Emissions (lb/hr) = Emissions (ton/yr) x 2,000 lb/ton / 8,760 hr/yr	
25			
26	EU-71 through EU-76 Warehouse Emissions		
27		Source	
28		EU-71 through EU-76	
29			
30	Methodology:		
31		Emission factor taken from AP-42 Table 9.12.3-1	
32		Emissions (ton/yr) = # barrels x EF (lb/barrel/yr) / 2,000 lb/ton	

	D	E	F	G
1	Appendix A: Emissions Calculations Summary of Emissions Company Name: MGPI of Indiana, LLC Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025 Significant Source Modification No.: 0296-35496-00005 Significant Permit Modification No.: 029-35505-00005 Reviewer: Kristen Willoughby Date: 12/22/2014			
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11				
12	Maximum Usage (PG/yr)	VOC Emission Factor (lb/1000 gal)	VOC Emissions (lb/hr)	VOC Emissions (ton/yr)
13	32,000,000	1.22	4.46	19.5
14	30,000,000	1.27	4.34	19.0
15	14,000,000	0.67	1.07	4.69
16	10,000,000	0.718	0.82	3.59
17	13,000,000	0.95	1.41	6.18
18	12,775,000	0.913	1.33	5.83
19			13.43	58.8
20				
21				
22				
23				
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25				
26				
27	Emission Factor (lb/barrel/yr)	# Barrels	VOC Emissions (lb/yr)	VOC Emissions (ton/yr)
28	6.9	541278	3,734,818	1,867
29				
30				
31				
32				

	A	B	C	D	E	F	G	H
1	Appendix A: Emissions Calculations							
2	Rail Car and Truck Loading Emissions.							
3								
4	Company Name: MGPI of Indiana, LLC							
5	Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025							
6	Significant Source Modification No.: 0296-35496-00005							
7	Significant Permit Modification No.: 029-35505-00005							
8	Reviewer: Kristen Willoughby							
9	Date: 12/22/2014							
10								
11	EU-46 Rail Car and Truck Loading Emissions							
12	Loading Properties ^(a)						Throughput ^(b)	
13	Emission Point	Loading Temperature (F)	Loading Temperature (R)	Vapor Pressure (psi)		Vapor Molecular Weight (lb/lb-mol)	Annual (1,000 gal/yr)	
14	Rail Car and Truck Loading	62	521.67	0.689		46	29,450	
15								
16	Emission Point	Saturation Factor ^(c)	Loading Loss ^(d) (lb/10 ³ gal)	Uncontrolled VOC Emissions ^(e)				
17				Annual (ton/yr)				
18								
19	Rail Car and Truck Loading	0.6	0.454	6.69				
20	Total			6.69				
21								
22	Methodology:							
23	(a) Vapor pressure and molecular weight taken from the material property information for ethanol.							
24	Antoine's Coefficients for ethanol: $\log P = A - [B/(T+C)]$; P in bar, T in K							
25	A = 5.37229							
26	B = 1670.409							
27	C = -40.191							
28	T = 289.667 K							
29	P = 0.047 bar							
30	P = 0.689 psi							
31	(b) Maximum annual production of: 31,000,000 gal/yr							
32	Product proof: 190 proof							
33	Product Ethanol concentration: 95%							
34	Maximum annual Ethanol throughput: 29,450,000 gal/yr							
35	(c) Saturation factor for submerged, dedicated loading taken from Section 5.2 of AP-42, Fifth Edition, Volume 1.							
36	(d) Loading loss estimate calculated according to the methodology in Section 5.2 of AP-42, Fifth Edition, Volume 1.							
37	Sample Calculation, average loading loss:							
38	$L_L \text{ (lb/10}^3 \text{ gal)} = 12.46 \text{ SMP} / T$; S = Saturation Factor (—)							
39	M = Vapor Molecular Weight (lb/lb-mol)							
40	P = Vapor Pressure (psi)							
41	T = Loading Temperature (R)							
42								
43	$L_L = \frac{(12.46) (0.6) (46 \text{ lb/lb-mol}) (0.689 \text{ psi})}{521.67 \text{ R}} = 0.454 \text{ lb} / 10^3 \text{ gal}$							
44								
45								
46	(e) Emissions estimated by applying the loading loss to the applicable loading throughput.							
47	sample calculation, annual emissions:							

	A	B	C	D	E	F	G	H
48			0.454 lb	29,450 x1,000 gal	ton	=	6.69	ton
49			1000 gal	yr	2,000 lb			yr
50								
51								
52								
53								
54								
55								
56								
57								
58								
59								

HAP	Product	HAP Fraction	Uncontrolled PTE HAP (ton/yr)
Acetaldehyde ¹	ethanol	1.00E-03	6.69E-03
Methanol ²	ethanol	5.00E-03	3.34E-02
Formaldehyde ¹	ethanol	1.00E-03	6.69E-03
Total			4.68E-02

1. Acetaldehyde and Formaldehyde are estimated to be at trace levels in ethanol. It will conservatively assume that these trace levels do not exceed 1000 ppm in the ethanol product.

2. Methanol concentration is based on maximum weight percent of 0.5% as per ASTM D 4806

Note: HAP emission rates based on performance tests at similar facilities.

	A	B	C	D	E	F	G
1	Appendix A: Emissions Calculations						
2	Equipment Leak Fugitive Emissions						
3							
4	Company Name: MGPI of Indiana, LLC						
5	Address: 7 Ridge Avenue, Lawrenceburg, Indiana						
6	Significant Source Modification No.: 0296-35496-00005						
7	Significant Permit Modification No.: 029-35505-00005						
8	Reviewer: Kristen Willoughby						
9	Date: 12/22/2014						
10							
11	EU-81 Equipment Leak Fugitive Emissions						
12						VOC	VOC
13						Emissions	Emissions
14						(lb/hr)	(ton/yr)
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							

EU-81 Equipment Leak Fugitive Emissions

Component	Count	Emission Factor (lb/hr/component)	% VOC	VOC Emissions (lb/hr)	VOC Emissions (ton/yr)
Pumps	124	0.0439	60%	3.27	14.31
Valves	4,481	0.0089	60%	23.93	104.81
Flanges	6,940	0.0005	60%	2.08	9.12
Total				29.28	128.23

Methodology:

Component counts based on facility estimates. Counts exclude components within former bottling operation that are no longer owned or operated by MGPI of Indiana, LLC.

Average SOCM emission factor, taken from "Protocol for Equipment Leak Emission Estimates", EPA-453/R-95-017, November 1995

Emissions (lb/hr) = # components x EF (lb/hr/component) x % VOC

Emissions (ton/yr) = Emissions (lb/hr) x 8,760 hr/yr / 2,000 lb/ton

Total Fugitive VOCs (ton/yr)

128.23

HAP	HAP Fraction	Fugitive HAP Emissions (tons/yr)
Acetaldehyde ¹	1.00E-03	1.28E-01
Methanol ²	5.00E-03	6.41E-01
Formaldehyde ¹	1.00E-03	1.28E-01
Total		0.90

1. Acetaldehyde and Formaldehyde are estimated to be at trace levels in ethanol. It is conservatively assume that these trace levels do not exceed 1000 ppm in the ethanol product.

2. Methanol concentration is based on maximum weight percent of 0.5% as per ASTM D 4806

	A	B	C	D	E	F	G
34	Fugitive HAP Emissions (tons/yr) = VOC (tons/yr) x HAP Fraction						

	A	B	C	D	E	F	G	H	I	J
1	Appendix A: Emission Calculations									
2	Natural Gas Combustion Only									
3	Utility Boiler									
4	Company Name: MGPI of Indiana, LLC									
5	Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025									
6	Significant Source Modification No.: 0296-35496-00005									
7	Significant Permit Modification No.: 029-35505-00005									
8	Reviewer: Kristen Willoughby									
9	Date: 12/22/2014									
10										
11	Heat Input Capacity	Potential Throughput								
12	MMBtu/hr	MMCF/yr								
13										
14	244.0	2095.5								
15										
16		Pollutant								
17		PM*	PM10*	direct PM2.5*			SO2	NOx	VOC	CO
18	Emission Factor in lb/MMBtu	1.9	7.6	7.6			0.6	280.0	5.5	84.0
19								**see below		
20										
21	Potential Emission in tons/yr	1.99	7.96	7.96			0.63	293.4	5.76	88.0
22										
23	*PM emission factor is filterable PM only. PM10 emission factor is condensable and filterable PM10 combined.									
24	PM2.5 emission factor is condensable and filterable PM2.5 combined.									
25	**Emission Factors for NOx: Uncontrolled = 280 (pre-NSPS) or 190 (post-NSPS), Low NOx Burner = 140, Flue gas recirculation = 100 (See Table 1.4-1)									
26										
27	Methodology									
28	All emission factors are based on normal conditions									
29	MMBtu = 1,020,000									
30	MMCF = 1,000,000 Cf									
31	Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,020 MMBtu									
32	Emission Factors from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, and 1.4-3, SCC #1-01-006-01, 1-01-006-04									
33	(AP-42 Supplement D									
34	Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton									
35										
36		HAPs - Organics								
37		Benzene	Dichlorobenzene	Formaldehyde			Hexane	Toluene		
38	Emission Factor in lb/MMBtu	2.1E-03	1.2E-03	7.5E-02			1.8E+00	3.4E-03		
39										
40										
41	Potential Emission in tons/yr	2.20E-03	1.26E-03	7.86E-02			1.89E+00	3.56E-03		
42										
43		HAPs - Metals								
44										
45		Lead	Cadmium	Chromium			Manganese	Nickel	Total HAPs	
46	Emission Factor in lb/MMBtu	5.0E-04	1.1E-03	1.4E-03			3.8E-04	2.1E-03		
47										
48										
49	Potential Emission in tons/yr	5.24E-04	1.15E-03	1.47E-03			3.98E-04	2.20E-03	1.98	
50										
51										
52	The five highest organic and metal HAPs emission factors are provided above.									
53	Additional HAPs emission factors are available in AP-42, Chapter 1.4.									
54										
55		Greenhouse Gas								

	A	B	C	D	E	F	G	H	I	J				
56	Emission Factor in lb			CO2	CH4	N2O								
57				120,000	2.3	2.2								
58														
59	Potential Emission in			125,732	2.4	2.3								
60														
61														
62														
63	Summed Potential Emissions in tons/yr			125,736										
64														
65	CO2e Total in tons/yr				126,479									
66														
67														
68														
69	Methodology													
70	The N2O Emission Factor for uncontrolled is 2.2. The N2O Emission Factor for low NOx burner is 0.64.													
71	Emission Factors are from AP 42, Table 1.4-2 SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03.													
72	Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.													
73	Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton													
74	CO2e (tons/yr) = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission ton/yr x CH4 GWP (25) + N2O Potential Emission ton/yr x N2O GWP (298).													

	A	B	C	D	E	F	G	H	I	J
1	Appendix A: Emission Calculations									
2	Natural Gas Combustion Only									
3	Utility Boiler									
4	Company Name: MGPI of Indiana, LLC									
5	Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025									
6	Significant Source Modification No.: 0296-35496-00005									
7	Significant Permit Modification No.: 029-35505-00005									
8	Reviewer: Kristen Willoughby									
9	Date: 12/22/2014									
10										
11	Heat Input Capacity	HHV	Potential Throughput							
12	MMBtu/hr	MMBtu	MMCF/yr							
13		MMcf								
14	47.6	1020	408.8							
15										
16										
17	Unrecognized Fuel Oil usage	HHV	Potential Throughput							
18	Heat Input Capacity	MMBtu	MMCF/yr							
19	MMBtu/yr	MMcf								
20	140736.0	1020	138.0							
21										
22										
23	Pollutant									
24		PM*	PM10*	direct PM2.5*	SO2	NOx	VOC	CO		
25	Emission Factor in lb/MMCF	1.9	7.6	7.6	0.6	100	5.5	84		
26						**see below				
27	Potential Emission in	0.39	1.55	1.55	0.12	20.4	1.12	17.2		
28										
29	Potential Emissions from Unr	0.13	0.52	0.52	0.04	6.90	0.38	5.80		
30										
31	Fuel Oil consumption									
32	*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.									
33	PM2.5 emission factor is filterable and condensable PM2.5 combined.									
34	**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32									
35										
36	Methodology									
37	All emission factors are based on normal firir									
38	MMBtu = 1,000,000 l									
39	MMCF = 1,000,000 Cubic Fe									
40	Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03									
41	Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,020 MMBtu									
42	Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton									
43										
44	HAPS Calculations									
45										
46	HAPs - Organics									
47		Benzene	Dichlorobenzene	Formaldehyde	Hexane	Toluene	Total - Organics			
48	Emission Factor in lb/MMCF	2.1E-03	1.2E-03	7.5E-02	1.8E+00	3.4E-03				
49										
50	Potential Emission in	4.292E-04	2.453E-04	1.533E-02	3.679E-01	6.950E-04	3.846E-01			
51										
52										
53										
54	HAPs - Metals									
55		Lead	Cadmium	Chromium	Manganese	Nickel	Total - Metals			
56	Emission Factor in lb/MMCF	5.0E-04	1.1E-03	1.4E-03	3.8E-04	2.1E-03				

	A	B	C	D	E	F	G	H	I	J
57										
58										
59	Potential Emission ir			1.022E-04	2.248E-04	2.862E-04	7.767E-05	4.292E-04	1.120E-03	
60										
61								Total HAPs	3.857E-01	
62	Methodology is the same as :							Worst HAP	3.679E-01	
63										
64	The five highest organic and metal HAPs emission factors are provided above.									
65	Additional HAPs emission factors are available in AP-42, Chapter 1.4.									
66										
67	<u>Greenhouse Gas Calculations</u>									
68										
69				Greenhouse Gas						
70				CO2	CH4	N2O				
71	Emission Factor in lb			120,000	2.3	2.2				
72										
73										
74	Potential Emission ir			24,528	0.5	0.4				
75										
76										
77	Summed Potential Emissions in tons/yr			24,529						
78										
79										
80	CO2e Total in tons/yr			24,674						
81										
82										
83	Methodology									
84	The N2O Emission Factor for uncontrolled is 2.2. The N2O Emission Factor for low NOx burner is 0.64.									
85	Emission Factors are from AP 42, Table 1.4-2 SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03.									
86	Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.									
87	Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton									
88	CO2e (tons/yr) = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission ton/yr x CH4 GWP (25) + N2O Potential Emission ton/yr x									

	A	B	C	D	E	F	G	H	I	J
1	Appendix A: Emissions Calculations									
2	Commercial/Institutional/Residential Combustors (< 100 MMBtu/hr)									
3	#1 and #2 Fuel Oil									
4	Company Name: MGPI of Indiana, LLC									
5	Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025									
6	Significant Source Modification No.: 0296-35496-00005									
7	Significant Permit Modification No.: 029-35505-00005									
8	Reviewer: Kristen Willoughby									
9	Date: 12/22/2014									
10										
11	Heat Input Capacity Potential Throughput			Limited Throughput					S = Weight Factor	
12	MMBtu/hr		kgals/year	kgals/yr					0.3	
13										
14	45.6		2853.3		1848					
15										
16	Unrecognized			Unrecognized						
17	Fuel Oil usage			Heat Input Capacity						
18	(kgals/year)			MMBtu/yr						
19	1005.3			140736.0						
20										
21										
22					Pollutant					
23				PM*	PM10	direct PM2.5	SO2	NOx	VOC	CO
24	Emission Factor			2.0	2.3	1.55	42.6	20.0	0.20	5.0
25							(142.05)			
26	Limited Emission Factor in lb/kgal						43.00			
27										
28	Potential Emission in tons/yr			2.85	3.28	2.21	60.8	28.5	0.29	7.1
29	Limited Emissions from fuel oil in tons/yr			1.85	2.13	1.43	39.7	18.5	0.185	4.62
30										
31	Methodology									
32	1 gallon of No. 2 Fuel Oil has a heating value of 140,000 Btu									
33	Potential Throughput (kgals/year) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1kgal per 1000 gallon x 1 gal per 0.140 MM Btu									
34	Emission Factors are from AP 42, Tables 1.3-1, 1.3-2, 1.3-3 and 1.3-6 (SCC 1-02-005-01/02/03) Supplement E 9/98 (see erata file)									
35	*PM emission factor is filterable PM only. Condensable PM emission factor is 1.3 lb/kgal.									
36	Emission (tons/yr) = Throughput (kgals/ yr) x Emission Factor (lb/kgal)/2,000 lb/ton									
37										
38				HAPs - Metals						
39				Arsenic	Beryllium	Cadmium	Chromium	Lead		
40	Emission Factor in lb/MMBtu			4.0E-06	3.0E-06	3.0E-06	3.0E-06	9.0E-06		
41										
42										
43	Potential Emission in tons/yr			7.99E-04	5.99E-04	5.99E-04	5.99E-04	1.80E-03		
44										
45										
46				HAPs - Metals (continued)						
47				Mercury	Manganese	Nickel	Selenium			
48	Emission Factor in lb/MMBtu			3.0E-06	6.0E-06	3.0E-06	1.5E-05			
49										
50										
51	Potential Emission in tons/yr			5.99E-04	1.20E-03	5.99E-04	3.00E-03	Total		
52								9.8E-03		
53										
54	Methodology									
55	No data was available in AP-42 for organic HAPs.									
56	Potential Emissions (tons/year) = Throughput (MMBtu/hr)*Emission Factor (lb/MMBtu)*8,760 hrs/yr / 2,000 lb/ton									
57										
58				Greenhouse Gas						
59				CO2	CH4	N2O				
60	Emission Factor			22,300	0.052	0.26				
61										
62										
63	Potential Emission in tons/yr			31,814	0.1	0.4				
64										
65										
66	Summed Potential Emissions in tons/yr				31,814					
67										
68										
69	CO2e Total in tons/yr				31,926					
70										
71										
72	Methodology									
73	The CO2 Emission Factor for #1 Fuel Oil is 21500. The CO2 Emission Factor for #2 Fuel Oil is 22300.									
74	Emission Factors are from AP 42, Tables 1.3-3, 1.3-8, and 1.3-12 (SCC 1-02-005-01/02/03) Supplement E 9/99 (see erata file)									
75	Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.									
76	Emission (tons/yr) = Throughput (kgals/ yr) x Emission Factor (lb/kgal)/2,000 lb/ton									
77	CO2e (tons/yr) = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission ton/yr x CH4 GWP (25) + N2O Potential Emission ton/yr x N2O GWP (298).									

	D	E
1	Appendix A: Emission Calculations Large Reciprocating Internal Combustion Engines - Diesel Fuel Emergency Generator	
2		
3		
4		
5	Company Name: MGPI of Indiana, LLC	
6	Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025	
7	Significant Source Modification No.: 0296-35496-00005	
8	Significant Permit Modification No.: 029-35505-00005	
9	Reviewer: Kristen Willoughby	
10	Date: 12/22/2014	

	A	B	C	D	E	F	G
12	B. Emissions calculated based on output rating (hp)						
13							
14			Output Horsepower Rating (hp)	1600.0			
15			Maximum Hours Operated per Year	500			
16			Potential Throughput (hp-hr/yr)	800,000			
17			Sulfur Content (S) of Fuel (% by weight)	0.500			
18							
19							Pollutant
20			PM*	PM10*	direct PM2.5*	SO2	NOx
21	Emission Factor in lb/hp-hr		7.00E-04	4.01E-04	4.01E-04	4.05E-03	2.40E-02
22						(.00809S)	**see below
23	Potential Emission in tons/yr		0.28	0.16	0.16	1.62	9.60
24	*PM10 emission factor in lb/hp-hr was calculated using the emission factor in lb/MMBtu and a brake specific fuel consumption of 7,000 Btu / hp-hr (AP-42 Table 3.3-1).						
25							
26	**NOx emission factor: uncontrolled = 0.024 lb/hp-hr, controlled by ignition timing retard = 0.013 lb/hp-hr						
27							
28	Hazardous Air Pollutants (HAPs)						
29							Pollutant
30							
31			Benzene	Toluene	Xylene	Formaldehyde	Acetaldehyde
32	Emission Factor in lb/hp-hr****		5.43E-06	1.97E-06	1.35E-06	5.52E-07	1.76E-07
33	Potential Emission in tons/yr		2.17E-03	7.87E-04	5.40E-04	2.21E-04	7.06E-05
34	***PAH = Polyaromatic Hydrocarbon (PAHs are considered HAPs, since they are considered Polycyclic Organic Matter)						
35	****Emission factors in lb/hp-hr were calculated using emission factors in lb/MMBtu and a brake specific fuel consumption of 7,000 Btu / hp-hr (AP-42 Table 3.3-1).						
36							
37							
38							
39	Green House Gas Emissions (GHG)						
40							Pollutant
41							
42			CO2	CH4	N2O		
43	Emission Factor in lb/hp-hr		1.15E+00	4.62E-05	9.24E-06		
44	Potential Emission in tons/yr		4.60E+02	1.85E-02	3.70E-03		
45							
46							
47							
48							
49	Emission Factors are from AP 42 (Supplement B 10/96) Tables 3.4-1 , 3.4-2, 3.4-3, and 3.4-4.						
50	CH4 and N2O Emission Factor from 40 CFR 98 Subpart C Table C-2.						
51	Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.						
52	Potential Throughput (hp-hr/yr) = [Output Horsepower Rating (hp)] * [Maximum Hours Operated per Year]						
53	Potential Emission (tons/yr) = [Potential Throughput (hp-hr/yr)] * [Emission Factor (lb/hp-hr)] / [2,000 lb/ton]						
54	CO2e (tons/yr)= CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission ton/yr x CH4 GWP (25) + N2O Potential Emission ton/yr x N2O GWP (298).						

	H	I
12		
13		
14		
15		
16		
17		
18		
19		
20	VOC	CO
21	7.05E-04	5.50E-03
22		
23	0.28	2.20
24		
25		
26		
27		
28		
29		
30		Total PAH
31	Acrolein	HAPs***
32	5.52E-08	1.48E-06
33	2.21E-05	5.94E-04
34		
35		
36		
37		
38	Potential Emission of Total HAPs (tons/yr)	4.41E-03
39		
40		
41		
42		
43		
44		
45		
46	Summed Potential Emissions in tons/yr	4.60E+02
47	CO2e Total in tons/yr	4.62E+02
48		
49		
50		
51		
52		
53		
54		

	A	B	C	D	E	F	G	H
1	<div>Appendix A: Emission Calculations</div> <div>Reciprocating Internal Combustion Engines - Natural Gas</div> <div>2-Stroke Lean-Burn (2SLB) Engines</div> <div>Company Name: MGPI of Indiana, LLC</div> <div>Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025</div> <div>Significant Source Modification No.: 0296-35496-00005</div> <div>Significant Permit Modification No.: 029-35505-00005</div> <div>Reviewer: Kristen Willoughby</div> <div>Date: 12/22/2014</div>							
2								
3								
4								
5								
6								
7								
8								
9								
10								
11			Maximum Heat Input Capacity (MMBtu/hr)	0.121				
12			Maximum Hours Operated per Year (hr/yr)	500				
13			Potential Fuel Usage (MMBtu/yr)	60.5				
14			High Heat Value (MMBtu/MMscf)	1020				
15			Potential Fuel Usage (MMcf/yr)	0.06				
16								
17								
18	Criteria Pollutants	PM*	PM10*	PM2.5*	SO2	NOx	VOC	CO
19	Emission Factor (lb/MMBtu)	3.84E-02	4.83E-02	4.83E-02	5.88E-04	3.17E+00	1.20E-01	3.86E-01
20	Potential Emissions (tons/yr)	0.001	0.001	0.001	1.78E-05	0.10	0.004	0.01
21	*PM emission factor is for filterable PM-10. PM10 emission factor is filterable PM10 + condensable PM.							
22	PM2.5 emission factor is filterable PM2.5 + condensable PM.							
23								
24	Hazardous Air Pollutants (HAPs)							
	Pollutant	Emission Factor (lb/MMBtu)	Potential Emissions (tons/yr)					
25	Acetaldehyde	7.76E-03	2.35E-04					
26	Acrolein	7.78E-03	2.35E-04					
27	Benzene	1.94E-03	5.87E-05					
28	1,3-Butadiene	8.20E-04	2.48E-05					
29	Ethylbenzene	1.08E-04	3.27E-06					
30	Formaldehyde	5.52E-02	1.67E-03					
31	Methanol	2.48E-03	7.50E-05					
32	Methylene Chloride	1.47E-04	4.45E-06					
33	Hexane	4.45E-04	1.35E-05					
34	Toluene	9.63E-04	2.91E-05					
35	2,2,4-Trimethylpentane	8.46E-04	2.56E-05					
36	Total PAH**	1.34E-04	4.05E-06					
37	Total		2.38E-03					
38								
39								
40	**PAH = Polyaromatic Hydrocarbon (PAHs are considered HAPs, since they are considered Polycyclic Organic Matter)							
41								
42	Methodology							
43	Emission Factors are from AP-42 (Supplement F, July 2000), Table 3.2-1							
44	Potential Fuel Usage (MMBtu/yr) = [Maximum Heat Input Capacity (MMBtu/hr)] * [Maximum Hours Operating per Year (hr/yr)]							
45	Potential Emissions (tons/yr) = [Potential Fuel Usage (MMBtu/yr)] * [Emission Factor (lb/MMBtu)] / [2000 lb/ton]							
46								
47				Greenhouse Gas (GHG)				
48	Greenhouse Gases (GHGs)			CO2	CH4	N2O		
49	Emission Factor in lb/MMBtu*			110	1.25			
50	Emission Factor in lb/MMcf**					2.2		
51	Potential Emission in tons/yr			3.33	0.04	0.00		
52								
53	Summed Potential Emissions in tons/yr			3.37				
54								

	A	B	C	D	E	F	G	H
55	CO2e Total in tons/y			4.29				
56								
57								
58								
59	Methodology							
60	*The CO2 and CH4 emission factors are from Emission Factors are from AP-42 (Supplement F, July 2000), Table 3.2-2							
61	**The N2O emission factor is from AP 42, Table 1.4-2. The N2O Emission Factor for uncontrolled is 2.2. The N2O Emission Factor for low NOx burner is 0.64.							
62	Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.							
63	For CO2 and CH4: Emission (tons/yr) = [Potential Fuel Usage (MMBtu/yr)] * [Emission Factor (lb/MMBtu)] / [2,000 lb/ton]							
64	For N2O: Emission (tons/yr) = [Potential Fuel Usage (MMCF/yr)] * [Emission Factor (lb/MMCF)] / [2,000 lb/ton]							
	CO2e (tons/yr) = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission ton/yr x CH4 GWP (25) + N2O Potential Emission ton/yr x N2O GWP (298).							
65								
66								
67	Abbreviations							
68	PM = Particulate Matter		NOx = Nitrous Oxides			CO2 = Carbon Dioxide		
69	PM10 = Particulate Matter (<10 um)		VOC - Volatile Organic Compounds			CH4 = Methane		
70	SO2 = Sulfur Dioxide		CO = Carbon Monoxide			N2O = Nitrous Oxide		
71						CO2e = CO2 equivalent emissions		

	A	B	C	D	E	F
1	<p align="center">Appendix A: Emission Calculations</p> <p align="center">Reciprocating Internal Combustion Engines - Diesel Fuel</p> <p align="center">Output Rating (<=600 HP)</p> <p align="center">Maximum Input Rate (<=4.2 MMBtu/hr)</p> <p align="center">Company Name: MGPI of Indiana, LLC</p> <p align="center">Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025</p> <p align="center">Significant Source Modification No.: 0296-35496-00005</p> <p align="center">Significant Permit Modification No.: 029-35505-00005</p> <p align="center">Reviewer: Kristen Willoughby</p> <p align="center">Date: 12/22/2014</p>					
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12	Emissions calculated based on output rating (hp)					
13						
14	Output Horsepower Rating (hp)		235.0			
15	Maximum Hours Operated per Year		500			
16	Potential Throughput (hp-hr/yr)		117,500			
17	Sulfur Content (S) of Fuel (% by weight)		0.500			
18						
19						Pollutant
20		PM*	PM10*	direct PM2.5*	SO2	
21	Emission Factor in lb/hp-hr	2.20E-03	2.20E-03	2.20E-03	2.05E-03	
22						
23	Potential Emission in tons/yr	0.13	0.13	0.13	0.12	
24	*PM10 emission factor in lb/hp-hr was calculated using the emission factor in lb/MMBtu and a brake specific fuel consumption of 7,000 Btu / hp-hr (AP-42 Table 3.3-1).					
25						
26	**NOx emission factor: uncontrolled = 0.024 lb/hp-hr, controlled by ignition timing retard = 0.013 lb/hp-hr					
27						
28	Hazardous Air Pollutants (HAPs)					
29						Pollutant
30						
31		Benzene	Toluene	Xylene	1,3-Butadiene	
32	Emission Factor in lb/hp-hr****	6.53E-06	2.86E-06	2.00E-06	2.74E-07	
33	Potential Emission in tons/yr	3.84E-04	1.68E-04	1.17E-04	1.61E-05	
34	***PAH = Polyaromatic Hydrocarbon (PAHs are considered HAPs, since they are considered Polycyclic Organic Matter)					
35	****Emission factors in lb/hp-hr were calculated using emission factors in lb/MMBtu and a brake specific fuel consumption of 7,000 Btu / hp-hr (AP-42 Table 3.3-1).					
36						
37						
38						
39	Green House Gas Emissions (GHG)					
40						Pollutant
41						
42		CO2	CH4	N2O		
43	Emission Factor in lb/hp-hr	1.15E+00	4.62E-05	9.24E-06		
44	Potential Emission in tons/yr	6.76E+01	2.71E-03	5.43E-04		
45						
46						
47						
48						
49	Methodology					

	A	B	C	D	E	F
50	Emission Factors are from AP42 (Supplement B 10/96), Tables 3.3-1 and 3.3-2					
51	CH4 and N2O Emission Factor from 40 CFR 98 Subpart C Table C-2.					
52	Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.					
53	Potential Throughput (hp-hr/yr) = [Output Horsepower Rating (hp)] * [Maximum Hours Operated per Year]					
54	Potential Emission (tons/yr) = [Potential Throughput (hp-hr/yr)] * [Emission Factor (lb/hp-hr)] / [2,000 lb/ton]					
55	CO2e (tons/yr) = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission ton/yr x CH4 GWP (25) + N2O Potential Emission ton/yr x N2O GWP (298).					

	G	H	I	J
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20	NOx	VOC	CO	
21	3.10E-02	2.51E-03	6.68E-03	
22				
23	1.82	0.15	0.39	
24				
25				
26				
27				
28				
29				
30				Total PAH
31	Formaldehyde	Acetaldehyde	Acrolein	HAPs***
32	8.26E-06	5.37E-06	6.48E-07	1.18E-06
33	4.85E-04	3.15E-04	3.80E-05	6.91E-05
34				
35				
36				
37				
38	Potential Emission of Total HAPs (tons/yr)		1.59E-03	
39				
40				
41				
42				
43				
44				
45				
46		Summed Potential Emissions in tons/yr	6.76E+01	
47		CO2e Total in tons/yr	6.78E+01	
48				
49				

	G	H	I	J
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51				
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55				